HMG 2020

General:

The HMG 2020 is a portable data recorder for recording pressure, temperature, flow rate, rpm etc. in industrial machinery and systems *(e.g. hydraulics, pneumatics)*. The HMG 2020 can record the measured values from up to five sensors simultaneously.

- 2 inputs for 4 to 20 mA sensors
- 2 inputs for either 4 to 20 mA or 0 to 10 V sensors
- 1 frequency input for digital signals in the range 0.3 to 30,000 Hz
- The measurement range and the unit for each sensor can be set as required (e.g. 0 to 250 bar, -25° to 100°C, 0 to 217 KN). Therefore, the majority of commercially available sensors with standard output signals can be connected and evaluated.
- As well as the current measured values, the unit also records the minimum and maximum values, in addition to the differential between two sensors of the same type.

Technical Details:

Measurement inputs Channel A and B Channel C and D Channel E	4 analog inputs / 1digital input 4 to 20mA,Ri approx. 100 Ω 4 to 20mA, Ri approx. 100 Ω or0 to 10V, Ri approx. 80 K Ω 0.3 Hz to 30 KHz,0 to 24V, switching threshold approx. 4 V
Accuracy Measuring channels A, B, C, D Measuring channel E	 0.25% of the measuring range 0.02% of the instantaneous value
Measuring Rate Normal operation Fast measurement	 100 ms can be reduced right down to approx. 1 ms *(depending on the sensors connected)*
Resolution	10 bit
Display	LCD display, 2 lines, each with 16 characters
Analog output (Channel A and B)	0.2 to 4 V
Interfaces Serial (RS 232) Parallel	 300 to 38400 baud, 8 data bits, 1 stop bit, 1 start bit, no parity check, handshake with CTS on pin 5 *(only for printer version)* Note: The plug connection on the HMG does not correspond to the RS 232 standard. standard connection, compatible with Centronics
Plug connections Sensor connection Interfaces	 D-sub 9-pole, socket D-sub 25-pole, socket
Voltage supply External voltage Internal voltage	 12...30 V DC, charging current max. 500 mA constant supply possible charging time approx. 3 hours when batteries flat 4 x NiMH batteries 1.2 V, Mignon
Battery life (with NiMH 1 AH batteries)	depending on the type of sensors connected e.g.: with 2 HYDAC pressure transmitters (4 to 20 mA signal) approx. 10 hours operation possible
CE mark	
Operating temperature	10° to 40°C
Air humidity	0 to 70% relative, non-condensing
Weight	approx. 500g

The HMG 2020 generally distinguishes between three measurement options:

1. **Normal measurement**
   Purely a display function where the measured values are displayed immediately.
   Ex: When HMG is measuring with pressure sensors to act as a digital gauge.
2. **Curve measurement**
   The measured values are displayed and simultaneously stored continuously in the internal memory. The courses of the curves can be printed out on the printer as soon as measuring has stopped, or transferred to a PC and viewed with the software.
3. **Log measurement**
   The measured values are displayed and can be stored as log entries in the internal memory. This method of measurement is used primarily for long-term measurements *(e.g. one week, one month, one year etc.)*. The log entries can be printed out on a printer as soon as measuring has stopped, or transferred to a PC.

The internal memory can store up to 50 different curves and logs with 250,000 measured values in total.

To optimize your measurements the unit has a wide variety of additional functions:

- **Choice of language**
  The user may define which language the unit will display the data and parameters.

Model Code:

HMG 2020 - 004 - E

Series
Series = HMG 2020

Modification number
004 = standard unit

User manual and documentation
E = English

- **Two trigger possibilities**
  Definition of events which start a curve measurement or which, on a log measurement, transfer the current measured values to memory.
  Ex: A curve is to be recorded when the temperature exceeds 50°C or the system pressure falls below 25 bar. The two triggers can in addition be linked together logically *(and/or following one another chronologically)*, so that data is recorded exactly at the required moment.
- **Definable displays**
  Define which measured variables should appear on the unit display.
  Ex: User display 1 of 5: current temperature value, peak value of the flow rate, minimum pressure value and current rpm value.
- **Identification of recorded curves or logs**
  The user can program in a specific 'company name' and assign a specific station number to the system being presently worked on. This specifies which system each measurement was recorded from.
- **Printer Options**
  These options enable print outs *(black & white or color)* to be done on commercially available printers. Additional details can be obtained from the technical information in this brochure, or simply by contacting one of our distributors.

Deluxe HMG Diagnostic Kits

See the inside back cover for details

The following are supplied:

4x NiMH rechargeable batteries, 1x power adapter for 110 VAC, 1x 2 meter A/B sensor cable *(A/B cables with Binder M714 type electrical connections)*, 1x operating manual, 2x ZBE-04 Binder M714 to DIN 43650 adapters.

Accessories must be ordered with full details:

- Pressure Transducers
  HDA 3700 & 3800 series
  (available from -1 to 9 to 0 to 600 bar)
  HDA 4475 series (modification 104)
  (available from 0 to 150 to 0 to 9000 psi)
- Temperature sensor
  ETS 4144-A-000 -25° to +100°C (-13° to 212°F)
- Flow rate sensor
- Turbine Style
  EVS 31X0-1 (6 to 60 l/min, 1.6 to 15.9 gpm) @ 400 bar
  EVS 31X0-2 (40 to 600 l/min, 10.6 to 159 gpm) @ 315 bar
  EVS 31X0-3 (15 to 300 l/min, 4 to 79.3 gpm) @ 400 bar
  EVS 31X0-5 (1.2 to 20 l/min, 0.3 to 5.3 gpm) @ 400 bar
- Measuring orifice
  (determines flow rate via differential pressure)
  EVS 1000-020 (5 to 20 l/min)
  EVS 1000-080 (20 to 80 l/min)
  EVS 1000-350 (80 to 350 l/min)
- Revolutions per minute frequency sensor
  HDS 1000
- Current sensor simulator
  SSS 1000
- Hydraulic adapter set *(Minimess series)* consisting of:

2 off adapter hoses DN 2 / 400 mm	1620/1620
2 off adapter hose DN 2 / 1000 mm	1620/1620
2 off pressure gauge direct connections	1620/G 1/4
2 off adapters	1615/1620
2 off bulkhead couplings	1620/1620

- Universal adapter set
  UVM 2000
- HMGWIN PC software
  With PC connection cable *(for serial interface)* and 9-pole to 25-pole adapter
- Analog output cable
  For channels A and B
- Connection cables
  (A/B cable or C/D cable) with 2 Binder plugs for pressure, temperature or flow rate sensors in the following lengths: 2m; 5m; 10m; 20m.
- ZBE 04
  (Binder plug adapter, series M714, to Hirschmann DIN 43650)
  Enables connection of pressure transmitters HDA 3XX5-A *(2-conductor 4...20mA signal with Hirschmann plug)* via the A/B or C/D connection cable
- Plastic carrying case with foam rubber insert

Regular HDA 4400 or 4700 series transducers must have pulse mode set to inactive.

HMGWIN

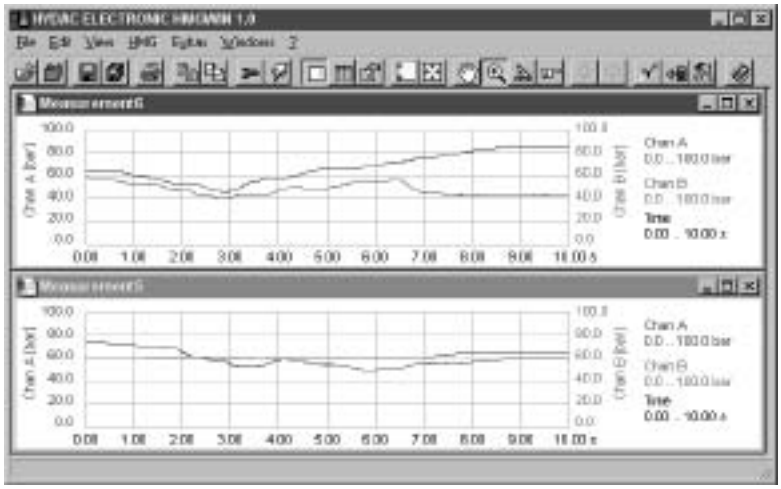
The HMGWIN PC program expands the measurement options of the portable HMG 2020 data recorder. HMGWIN is compatible with Windows 95/98/NT, user friendly, an interactive software package that allows the user to download the stored data and study it in greater detail.

For the user who wishes to store or further evaluate the recorded measurement curves and measurement logs, this HMGWIN provides a range of useful functions.

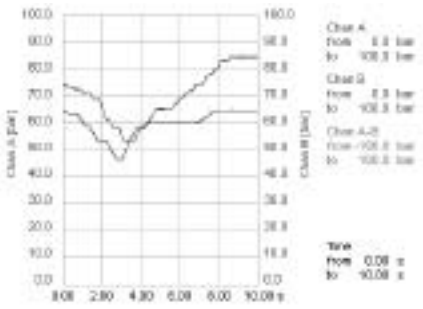
Features:

- Transfer and Storage of curves and logs from the HMG 2020 to a PC.
- Viewing of up to 4 different recorded curve or log measurement simultaneously on the monitor.
- Superimposition of curves
  Parts of different curves can be superimposed in a new graph, for example to show the wear and tear of a machine *(new condition/current condition)*.
- Straight edge function
  As with a straight edge, you can measure the curves using the mouse *(exact time and amplitude value)*. Absolute measured values and also relative measured values *(measurement in relation to a set marker)* can be displayed.
- Zoom function
  Using the mouse, part of a graph can be framed. The framed area appears as a new graph, enlarged accordingly.
- Online function
  The portable data recorder measures and transfers the current measured values straight onto the PC. These are then immediately displayed as a graph in realtime *(comparable with the function of an oscilloscope)*. The graph displayed can be stored if there are any interesting results.
- Portable data recorder
  Settings can be transferred to the PC and may be stored. The reverse is also possible, so, for example, settings for taking measurements on a particular machine can be fed into the HMG 2020 again and again.
- Data conversion
  HMGWIN can convert the HMG 2020 data into some other data formats. This means, for example, that the recorded curves can be transferred to many other PC programs *(spreadsheets, database, word processing etc.)* and further processed.

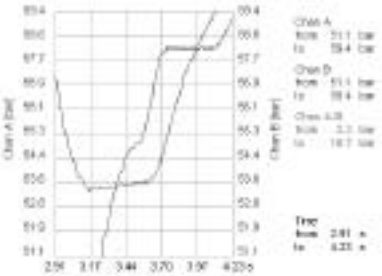
HMG 2020 connected to a PC



Screen showing multiple graphs and whole measurement curve



Overlay of two measurement curves



Zoomed section from overlay

The following are accessories available for use with the HMG 2020 Recordable Data Recorder:

1 Portable Data Recorder HMG 2020
Measurement unit for recording all sensor signals. Base unit of the complete measurement unit set including main supply units.

2 HMGWIN software
Windows based PC software program designed to extend the measurement possibilities of the HMG 2020. Compatible with Windows 95, 98, and NT.

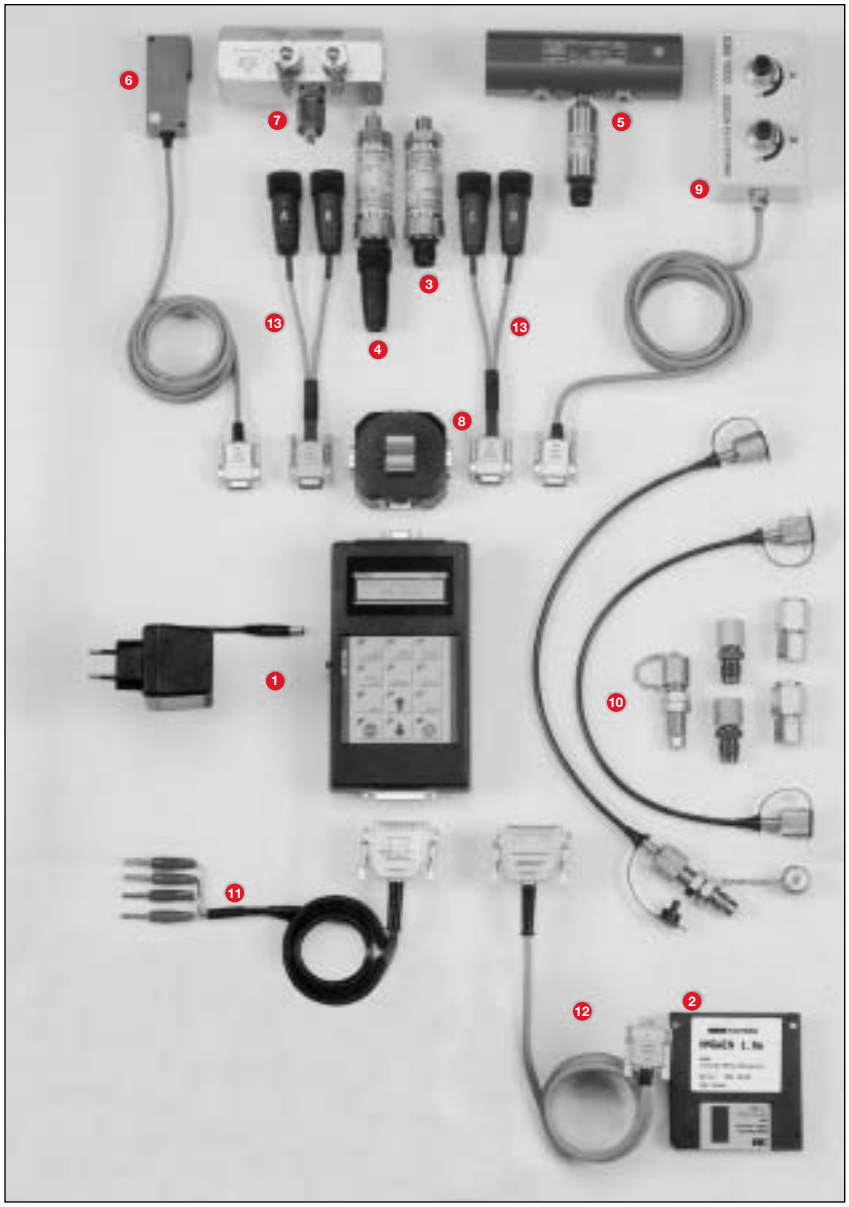
3 Pressure transmitter
For pressure measurement we supply pressure transmitters in the accuracy classes 0.3%, 0.5% and 1%, with many different measuring ranges from 0 to 150 psi up to 9000 psi. Required output signals: 4...20 mA or 0...10 V.

4 Temperature sensor
The temperature sensor ETS 4000 has a measuring range of -25...100°C with current output 4...20 mA. It is pressure resistant up to 8700 psi.

5 Flow rate sensor
For accurate flow rate measurement *(< ± 2% of the instantaneous value)* we supply aluminum turbines as standard in the measuring ranges 1.2 to 20 l/min; 6...60 l/min; 15...300 l/min and 40...600 l/min. Each supplies an output signal of 4...20 mA, and have two G 1/4" BSP threaded connections for connecting additional sensors, ex: pressure transmitters and temperature sensors. Our flow rate meters are also available in stainless steel with various measuring ranges.

6 HDS 1000
The rpm probe HDS 1000 is suitable for measuring the speed of rotating bodies. The principle is based on a reflecting light barrier with adhesive foil strips.

7 Flow rate orifice
The measuring orifice EVS 1000 enables cost-effective flow rate recording via differential pressure measurement. The following measuring ranges are available as standard 5...20 1/min, 20...80 1/min and 80...350 1/min. The measuring points of the measuring orifice are in each case Minimess connections, series 1620.



8 Universal adapter set
The universal adapter set, UVM 2000, is needed to connect more than two sensors for simultaneous measurement *(distributor function)* or if external sensors are used. These can be connected by means of screw terminals.

9 SSS 1000
The current sensor simulator SSS 1000 was designed for teaching purposes. It can be used to simulate two current sensors (4...20 mA) via rotary potentiometers. Personnel can learn how to use the HMG, or consolidate their knowledge of the unit, in the office. The current sensor simulator is particularly suitable for staff training.

10 Hydraulic adapter set
The hydraulic adapter kit allows pressure transmitters with G 1/4" A external thread to be connected to existing Minimess pressure connections, series 1620 or 1615.

11 Analog output cable
The analog output cable can be used to transfer the current measured values of channels A and B as a voltage signal to an oscilloscope or a recorder.

12 PC Cable
Connects HMG to computer

13 Sensor Connection
Cables A-B and C-D

HMG Deluxe Diagnostic Kit

Part # 02070911

HYDAC has packaged these components to be the perfect start-up kit for performing diagnostics on mobile & industrial applications. You can add HYDAC flow sensors, different pressure & temperature transducers at any time. Also included is an extra ZBE 04 connector for connecting to existing transducers & indicators already installed on your equipment.

Kit Includes:

A - HMG 2020-004-E
(rechargeable batteries included)
B - Power Supply Cord
C - UVM 2000 Connector Hub
D - C & D Sensor Cable
E - A & B Sensor Cable
F - PC Cable
G - HMG WIN software
H - HDA 4475 Pressure Transducers (3)
(1000, 3000, and 6000 psi)
I - ETS 4144 Temperature Transducer
J - ZBE 04 Connectors (4)

Entire kit comes neatly packaged in a durable carrying case. (see photo on page 50.) Complete operation manual is included.

Custom kits are available.